



Spatial and Temporal Variability of Ambient Ammonia (NH₃) and other Gas pollutants in Urban and Peri-Urban Dar es Salaam, Tanzania as Measured by Low cost Gas Sensors

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Air pollution remains a critical global challenge, disproportionately impacting vulnerable communities in low- and middle-income countries. Weak policies, fragmented institutions, limited financial and computational resources, and lack of comprehensive monitoring infrastructure hinder effective air quality (AQ) management. Dar es Salaam city with population of about 7 million, is among the world's Megacities that is undergoing rapid urbanization with accompanying infrastructure development but with underdeveloped waste management.

Monitoring of ammonia concentration gas was made at urban and peri-urban sites in Dar es Salaam city to identify its spatial and temporal variability. The monthly mean ammonia concentrations measured at two sub-urban sites (Buza Hospital and Temeke DMDP) were 34.9 and 16.6 ppm, respectively. The monthly mean ammonia concentrations at urban site (DIT, Kigamboni, Makuburi, Sinza Hospital and Mlimani city) were, 8.2, 8.85, 22.02, 16.5, and 7.2, respectively. Further, a comparison of the measured hourly data at urban and peri-urban sites showed its relative dominance at peri-urban sites during the evening hours while during the morning hours the dominance was to the urban sites. Different studies suggest that the trend of ammonia levels should be tightly affected by an increasing number of vehicles (morning traffic jams in urban areas) as well as agricultural and livestock activities (common in peri-urban areas). As such, the results of our statistical analysis point to the potentially significant role of agriculture and livestock activities in the elevation of ammonia levels in peri-urban areas of Dar es Salaam city.